

ECONOMIC COMPONENT OF ANC PAYMENTS. EXAMPLE OF THE FARMS IN POLAND

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Abstract

Conducting agricultural activity in areas facing natural constraints (ANC) affects farms' production and economic results. ANC payments were introduced to compensate farmers for higher costs and lost income. The aim of the study is to compare the production and economic results of farms receiving ANC support with other farms. It was hypothesized that ANC farms achieve lower production and economic results than other units. The analysis is based on Polish FADN data concerning 2015. The sample included 12,105 farms, of which 4,652 (38.43%) received ANC subsidies. To describe the characteristics of the surveyed farms, positional measures were used due to strong asymmetry. The Mann-Whitney U test was used to assess the significance of differences in distributions. The results indicate the existence of significant differences in the production potential, production and economic efficiency of farms receiving ANC payments and ones without them. Agricultural farms receiving ANC payments are characterized by a significantly smaller area of agricultural land, a lower share of arable land in the UAA and a smaller share of leased land. They also have lower production volume, lower land and labour productivity. They achieve relatively lower incomes. Nevertheless, the payments to a small extent reduce these differences. On this basis, it can be concluded that ANC payments in Poland do not provide full compensation for differences in the production and economic results of a farm with worse agri-environmental conditions. Therefore, the impact of the CAP on the economic results of farms located in ANC is relatively small.

Key words: CAP instruments, LFA/ANC payments, production and economic results of agricultural holdings.

Introduction

Conducting agricultural activity in areas facing natural constraints (ANCs)¹ affects the production and economic results achieved by farms. This can even lead to reduction of agricultural activity (Vittis, Gadanakis, & Mortimer, 2017) and ANCs impede farm economic growth (Giannakis & Bruggeman, 2015). Therefore, ANC payments were introduced to compensate farmers for additional costs and lost income in order to keep agricultural activity and thus viable rural communities in such areas. Subsidies for farms operating in areas with specific limitations to efficient agricultural production are one of the longest, still operating instruments of the EU common agricultural policy (CAP). It was introduced in 1985². Currently the ANCs occupy over 50% of the EU UAA (Pažek *et al.*, 2018). The objective of this support is to contribute to the maintaining of the countryside as well as to the maintaining and promoting sustainable farming systems by encouraging continued use of agricultural land (Regulation (EU) No 1305/2013).

There is vast literature on the production and economic indicators of farms operating in areas facing natural or other constraints. It shows significant differences in the production between ANC and non-

ANC farms (Štřeleček *et al.*, 2008). Yet, there are also examples of farms operating in ANCs that achieve farm net value added per one annual working unit very good in comparison with other regions. This is the case of Czech farms with an extensive cattle breeding (Doucha, Štolbová, & Lekešová, 2012). The impact of ANC payments on the economic performance of farms is mixed. The study concerning the payments in the period 2004–2012 based on comparison of selected economic indicators showed that positive impact of these subsidies was observed only in mountainous areas (Lososová, Svoboda, & Zdeněk, 2016). The differences are stated also between countries. Štolbová *et al.* (2007) revealed that a significant impact of ANC subsidies was observed in the case of Czech farms, but not in the Polish ones.

The studies show contradictory results to the question of the impact of the ANC payments on maintaining agricultural activity. Positive impact was observed in the case of mountain farms in Austria, where the subsidies also contributed to offsetting higher production costs (Hovorka, 2006). A study of Latvian farms showed a positive impact (Veveris, Lakovskis, & Benga, 2014). The same applied to the study concerning Czech and Slovakian farms (Štolbová & Molčanová, 2009), while the study concerning Poland

¹ Throughout the paper the current name of these areas is used in accordance with the Regulation (EU) No 1305/2013. Yet, it must be mentioned that before the programming period 2014–2020 the name of less favoured areas (LFAs) was used.

² LFAs were established in the European Union under the Directive 75/268/EEC on mountain and hill farming, and farming in certain less-favoured areas. The support measure was introduced by the regulation 797/85.

Table 1

Current rates of payments for the Polish ANCs

Type of ANC	Rate (PLN ha ⁻¹ year ⁻¹)	Approximate rate in EUR
Mountainous areas	450	107
Lowland zone I	179	43
Lowland zone II	264	63
Specific	264	63

Source: Ministerstwo Rolnictwa i Rozwoju Wsi (2018).

showed that this impact was insignificant (Giesecke, Horridge, & Zawalińska, 2010).

The problem of economic results of farms operating in ANCs is also of vital importance in the debate on the fine-tuning of delimitation of these areas called for by the last CAP reform. For example, the research on ANC farms in Greece showed that the farms in other than mountainous ANCs achieve higher gross revenues as a result of production of higher valued crops which leads to a conclusion that farms in mountainous ANCs need more support (Oxouzi *et al.*, 2012). The current trend promoted by the European Commission is to focus on the environmental aspects of the agricultural land. According to some studies, this would be a good opportunity to take into account such constraints as a high risk of droughts (Štolbová, 2011).

ANC payments can be received in Poland by farmers whose farms are located in four types of ANCs. Distinguished are the following types of ANCs: mountainous areas, lowland zone I, lowland zone II and areas with specific handicaps. The vast majority of the Polish ANCs are lowland areas, which account for 92.6% of ANCs in Poland, while the mountainous areas account for only 2.1% of the ANCs (Namiołtko, Góral, & Soliwoda, 2017). The rates of payments depend on the type of ANC (Table 1). The ANC payments are subject to degressivity at farm level, depending on the total area of agricultural land covered by these subsidies:

- ANC area of up to 25 ha – 100% of payment;
- ANC area of 25.01 to 50 ha – 50% of payment;
- ANC area of 50.01 to 75 ha – 25% of payment.

The aim of the study is to present the conditions and compare the production and economic results of farms receiving ANC support with farms without such support. It has been hypothesized that farms, despite receiving ANC support, achieve lower production and economic results than other units.

The results of our research are part of the debate on the future of the CAP and its instruments. The possible diminution of the CAP's budget in the next programming period calls for increasing the efficiency

and effectiveness in the use of the funds available. Therefore, the impact of specific policy instruments and their combination can serve as an important argument in the discussion on reshaping CAP's instruments.

Materials and Methods

The analysis was carried out on the basis of accountancy data obtained in 2015 from agricultural enterprises enrolled in the Polish FADN. Among 12,105 individual farms surveyed, 4,652 (38.43%) received payments for managing farms in areas with natural constraints. The largest percentage of farms that received ANC payments were farms located in lowland areas: I (68.76%) and II (25.76%). Farms with specific difficulties constituted 3.55%, while those in the mountain zone were 1.83%. In 2015, the surveyed farms received more than PLN 21.57 million in ANC payments. The analysis takes into account the production and economic results of farms operating in areas facing natural constraints (ANC) and not facing natural limitations (N_ANC). The study includes: a) production potential of farms, which has been characterized by variables such as: agricultural area, share of leased land in UAA, structure of arable lands, livestock density (LU ha⁻¹); b) production effects, productivity of factors of production and economic efficiency, characterized by: total production value, land productivity (PLN '000 ha⁻¹), gross value added, farm income, net value added per full-time person (PLN '000 AWU⁻¹), income from a family farm per a full-time employee and labour efficiency. Due to the existence of a strong asymmetry in the distributions of variables selected for the analysis, position measurements were used for their description (i.e. median, min, max, range, lower quartile and upper quartile). To verify the research hypothesis adopted for the purposes of the paper and the lack of conformity of distributions of the examined features with the normal distribution, the non-parametric Mann-Whitney U test was used. This test verifies the hypothesis of significant differences between distributions of traits in two independent populations (Moczko, 2014; Mann & Whitney, 1947).

Results and Discussion

The production potential of farms receiving ANC payments and without ANC payments was clearly different. Farms receiving payments for areas with natural constraints were characterized by a smaller size of agricultural land compared to farms with better quality environmental conditions. However, these differences were not significant. In the group of ANC farms, half of them operated on an area equal or smaller than 22.7 ha, while farmers with farms outside ANC had an area equal to or smaller than 25.1 ha (Table 2). The value of the asymmetry coefficient in both groups of farms indicates the presence of right-sided asymmetry, which means that the units with above average values predominate. Agricultural farms receiving ANC subsidies showed a much lower share of the lease in the land use structure. In the agricultural structure of the production space, arable land predominated in both groups of analysed farms. The value of the asymmetry coefficient indicates that both the first and the second group of farms are dominated by units with below-average values. It should be noted that farms with potentially better farming conditions were characterized by a relatively higher share of arable land in total area compared to ANC farms. This can affect the way of conducting agricultural activity and the type of farming, and thus also the effectiveness and competitiveness of farms. At the same time,

farms with ANC payments were characterized by a much larger share of permanent grasslands. Farms in which meadows and pastures have a high share in the structure of agricultural land are characterized by the combination of various types of plant and animal production. According to FADN data, in 2015 over one third of the farms receiving ANC payments in Poland conducted mixed production, thus, striving to take full advantage of the natural production potential of soils (Jha, Tripathi, & Mohanty, 2009), but also to maintain greater stability and financial security (Kurdyś-Kujawska, 2016). Moreover, according to Barszczewski (2015), farming on permanent grassland is generally carried out extensively. The share of grassland in the production structure of farms is related to the stocking of animals. Hence, in farms operating on areas with natural constraints there is a higher density of animals than in other farms. Meadows and pastures are used to produce high-nutritional forage at lower production costs. The stocking of animals in the ANC located holdings ensures an adequate inflow of organic matter from natural fertilizers to arable lands and enables the balancing of nutrients in the soil. Therefore, farmers from these farms are not forced to apply other practices (i.e. incorporation of straw or of secondary crops or purchase of natural fertilizers) (Wróbel & Barszczewski, 2016). To a large extent this influences the fertilizer costs per 1 ha of UAA,

Table 2

Production potential of farms operating in ANC and outside of ANC

Specification	Median	Min	Max	Lower quartile	Upper quartile	Range	Skewness
UAA (ha)							
N_ANC	25.1	0	665	14.74	44.3	665	4.8
ANC	22.7	1	703	13.8	39.4	25.6	5.7
Share of leased land in UAA (%)							
N_ANC	16.8	0	100	0	40.0	100	0.8
ANC	12.4	0	100	0	38.7	100	0.9
Share of arable land in UAA (%)							
N_ANC	94.1	0	100	75.1	100	100	-1.7
ANC	81.8	0	100	62.5	96.83	100	-1.1
Share of permanent grassland in UAA (%)							
N_ANC	3.6	0	100	0	18.2	100	1.9
ANC	15.5	0	100	1.3	33.8	100	1.1
Animals per ha (LU ha ⁻¹)							
N_ANC	0.17	0	1135	0	1.99	1135	82.54
ANC	1.06	0	49.2	0	1.99	49.2	8.7
Soil valuation index							
N_ANC	0.9	0.05	1.9	0.6	1.1	1.8	-0.1
ANC	0.6	0.05	1.7	0.4	0.8	1.6	0.3

Table 3

Production and economic efficiency of farms operating in ANC and outside of ANC

Specification	Median	Min	Max	Lower quartile	Upper quartile	Range	Skewness
Total output (PLN '000)							
N_ ANC	155,990	-11,333	11,441.360	78,868	292,985	11,452.692	12.0
ANC	116,073	1,806	8,002.207	57,335	234,704	8,000.400	7.8
Land productivity (PLN '000/ ha ⁻¹)							
N_ ANC	5,509	0,027	9,666.378	3,929	8,522	9,666.351	46.1
ANC	4,852	0,187	1,978.235	3,184	7,543	1,978.048	26.9
Gross value added (PLN '000)							
N_ ANC	78,798	-158,359	8,863.501	38,380	151,837	9,021.860	15.2
ANC	67,316	-55,598	1,812.419	33,488	132,751	1,868.017	4.3
Farm income (PLN '000)							
N_ ANC	52,636	-526,930	5,609.913	21,611	107,466	6,136.843	12.1
ANC	43,587	-213,691	1,457.884	20,44	65,851	1,452.921	6.1
ANC *	47,600	-205,088	1,547.558	20,315	96,766	1,752.646	4.4
Farm value added per agricultural work unit (PLN '000 AWU ⁻¹)							
N_ ANC	32,384	-123,759	586,534	14,201	61,794	710,292	3.0
ANC	25,858	-100,791	780,889	11,507	51,424	881,680	3.5
Family farm income expressed per family labour unit (PLN '000 FWU ⁻¹)							
N_ ANC	30,272	-335,624	2,804.957	12,249	62,369	3,140.581	10.7
ANC	24,518	-244,962	1,245.789	10,016	51,921	1,270.285	51.7
Labour productivity (PLN '000 AWU ⁻¹)							
N_ ANC	95,303	-11,333	10,496.370	52,315	171,401	10,507.703	14.5
ANC	70,631	1,604	13,167.383	36,951	135,667	13,165.778	22.2

* farm income with ANC payments. The average value of subsidies paid per one farm amounted to PLN 4,638. The value of funds received was strongly diversified. The minimum and maximum values were respectively at PLN 145 and PLN 57,752. The exchange rate is: 1 EUR = 4.2 PLN

The obtained results of the Mann-Whitney U test allow to conclude that there are reasons to state the occurrence of differences in distribution of characteristics regarding production and economic results between farms receiving ANC payments and without them (p=0.0001).

which are significantly lower in farms receiving ANC payments (median PLN 468.55 ha⁻¹) than in farms without these subsidies (median PLN 659.20 ha⁻¹). The production capacity of farms is also conditioned by the level of quality of the soils. According to the results of the conducted research, ANC operating farms were characterized by significantly worse soils than farms without ANC payments. This is confirmed by the value of soil valuation index.

As shown by the results of the conducted research, a much higher value of agricultural production is visible in farms located in areas with potentially better environmental conditions than in the case of farms receiving ANC payments. The median value shows that in half of the ANC farms the value of production was equal to or lower than PLN 116,000, while in holdings other than ANC it was less than or equal to PLN 155,000 (Table 3). Taking into account the indicator

of land productivity, also in this case higher values of the indicator were characteristic of farms conducting agricultural activity under better environmental conditions. The value of the asymmetry coefficient in both groups of farms indicates the existence of a strong right-sided asymmetry, which means that the units with above-average features value are the majority. In addition to land productivity, one of the important measures of synthetic farm productivity is the labour productivity indicator. Labour productivity measured by net value added per full-time employee, family farm income and the value of agricultural production per one full-time employee on a farm shows a high level of differentiation between farms receiving ANC payments and without them. It should be noted, however, that considering the amount of ANC payments received by agricultural holdings to a small extent reduces the differences between

the amount of incomes of agricultural holdings conducting agricultural activity in areas with natural constraints and other farms. An important category, which reflects not only the increase in the value of goods produced by an agricultural holding, but also the impact of agricultural policy on the economic situation of a farm due to subsidies and taxes, is gross value added (Goraj & Mańko, 2009). The research proved that farms receiving ANC payments achieved a significantly lower volume of agricultural production than the other ones.

Conclusions

1. There are significant differences in the production potential as well as production and economic efficiency between farms conducting agricultural activity in areas with natural constraints and farms with potentially better environmental conditions.
2. Agricultural holdings receiving ANC subsidies in Poland are characterized by a significantly smaller area of arable land, a lower share of arable land in the UAA and a smaller share of leased land.
3. On the basis of the conducted research, it can be concluded that ANC subsidies granted in Poland according to the current criteria do not ensure full compensation of differences in the production and economic results of farms with worse agri-environmental conditions. Therefore, the impact of the common agricultural policy on the production and economic results of farms operating in ANC is relatively insignificant.

Compared to farms with better environmental conditions, farms operating in areas with natural constraints are characterized by significantly lower land productivity and labour productivity. The size of the gross value added by agricultural holdings receiving ANC subsidies indicates that these farms do not equal the other farms in terms of volume of agricultural production. They achieve relatively lower family farm incomes and ANC subsidies received by them reduce these differences only to a small degree. The research results provide the basis for a positive verification of the hypothesis.

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